

COURSE SYLLABUS

Meteorology 418W (Fall 2004)

Topics in Mesoscale Meteorology

Time/Place. By appointment.

Instructor. Dr. John W. Diercks.

Office. 620 Walker Building, 863-6089, diercks@ems.psu.edu.

Office Hours. Monday, Wednesday, and Friday, 9:00 – 10:00 AM; Tuesday and Thursday, 8:00 - 9:00 AM; plus most other times when the office door is open.

Worldwide Web. This syllabus is available on the Worldwide Web at <http://www.ems.psu.edu/~diercks/syllabusmeteo418w.html>. Examples of semester projects completed by students in previous semesters are also provided at <http://www.ems.psu.edu/~diercks/meteo418w.html>. Only the title, abstract, introduction, and selected figures are included in these examples.

Academic Integrity. This course follows the College of Earth and Mineral Sciences' academic integrity policy (see <http://www.ems.psu.edu/students/integrity/statement.html>).

Required Text. None.

Computer-Based Learning (CBL) Modules: CBL modules authored by the Cooperative Program for Mesoscale Meteorology, Education and Training (COMET) are an integral part of this course. These modules and two MS-DOS-based PCs with laser disk players and supporting software are available for student use on an appointment basis in Room 530 Walker Building. Another COMET PC workstation for CDROM-based modules is also located in Room 530.

References.

1. Mesoscale Meteorology and Forecasting, Peter S. Ray.
2. Radar for Meteorologists, or, You too can be a Radar Meteorologist, Part III, Ronald E. Rinehart (on reserve at EMS Library).
3. Doppler Radar and Weather Observations, Richard J. Doviak and Dusan S. Zrnica (on reserve at EMS Library).
4. Federal Meteorological Handbook, No. 11 (Doppler radar) (on reserve at EMS Library).
5. Mesoscale Meteorology 414 notes on CDROM, Dr. Paul Markowski.
6. Writing Manual for Students, Joe Schall.

Examination Policy. There are no formal examinations in this course. Students are required to take tests and answer all questions included in the COMET CBL modules.

Grading Policy. Final grades will be based on completion of four COMET modules, written papers prepared on a topic related to each of the first three COMET modules, a written summary of an individual semester project, and the effort and initiative displayed by the student during the semester. Student papers will be graded on their meteorological thoroughness and the clarity in which they are written. The final grade will be based mainly on

written papers; there will be no examinations in the course. The semester project will be weighted twice as heavily as the other three papers. Unless otherwise coordinated with the instructor, papers handed in late will be downgraded at least one letter grade.

Reading Assignments.

1. Documentation provided by COMET on each CBL module.
2. Pertinent chapters in the above references.
3. Background information for short papers and semester projects, as required.

Writing Assignments: The course includes five written assignments. The first paper will be a proposal (not graded) which outlines the topic and research for a semester-long project. The next three papers will cover topics related to the first three major topics in the course: Doppler radar interpretation, boundary detection and convection initiation, and heavy precipitation and flash flooding. These individual topic papers will be marked and graded by the instructor. The papers will be returned to and discussed with the students during an individual appointment with the instructor. The students will have the opportunity to give these papers to the instructor for feedback before handing them in for a final grade. A draft of the paper which summarizes the results of the semester-long project may be given to the instructor for comments prior to the final product (recommended). Students are encouraged to seek assistance from Joe Schall, the writing consultant for the College of Earth and Mineral Sciences, and to seek feedback from other students before submitting papers to the instructor.

Objectives of Writing Assignments: The writing assignments have three objectives. First, the student will be allowed to select a topic related to each of the first three broad areas covered in the course. Topics will be selected with concurrence of the instructor and will allow the student to explore topics of interest in considerably more depth than is possible from a lecture on the topic. Second, these papers will familiarize the student with writing styles and content that will be required in their future professional careers. Third, the student will be given the opportunity to summarize in a written paper original undergraduate research conducted during the semester on a topic in mesoscale meteorology.

Notes on Papers:

1. Length:
 - a. The proposal should not exceed one doubled-spaced typed page.
 - b. The three papers related to topics of individual modules should be between 5 and 10 double-spaced typed pages, excluding figures. These limits are not absolute. Papers will not be graded on length unless they are excessively short or long. An excessively short paper generally results from superficial treatment of the topic; an excessively long paper is the result of padding or failure to write concisely.
 - c. The final report, which summarizes the semester project, will vary in length, depending on individual student projects. These reports generally will exceed 10 double-spaced typed pages, excluding figures.
2. Style and format: The final report of the semester project should follow the style and format of a paper in a meteorological professional journal, such as the Monthly Weather Review. For example, the report should include an abstract, introduction, internal sections, concluding remarks, acknowledgements (if appropriate), and references. Abbreviations and references for all papers also should follow standards used in meteorological professional journals.
3. Level: Content should be written at the level of a senior or first-year graduate student in meteorology.
4. Figures and equations: Students are encouraged to use figures and equations where they clarify or simplify the

papers.

5. Overall comments: Papers must be neat, free of typographical errors, and double spaced. Papers may be stapled together or enclosed in some type of binder.

Class Structure. This will be a self-paced independent study course. You should plan on meeting with the instructor once a week (as a minimum) at a mutually agreeable time to discuss progress. Minimum course requirements follow:

1. Complete four COMET CBL modules. The student must complete the modules listed in paragraphs a, b, and c below, and then has a choice to complete one of the seven modules listed in paragraphs d – k by the last day of class (10 December 2004). The modules are:

- a. Workshop on Doppler Radar Interpretation (module, 21 Sep 04; paper, 28 Sep 04).
- b. Boundary Detection and Convection Initiation (module, 19 Oct 04; paper, 26 Oct 04).
- c. Heavy Precipitation and Flash Flooding (module, 9 Nov 04; paper, 16 Nov 04).
- d. Forecast Processes.
- e. Numerical Weather Prediction.
- f. Extratropical Cyclones.
- g. Satellite Meteorology: Remote Sensing Using the New GOES Imager.
- h. Anticipating Convective Storm Structure and Evolution.
- i. An MCS Matrix, Including Mesoscale Convective Systems: Squall Lines and Bow Echoes.
- j. Satellite Meteorology II: Case Studies using GOES Imager Data.
- k. A web-based module selected from the module index at <http://www.comet.ucar.edu/modules/index.htm>.

2. Three short papers on topics related to each of the first three CBL Modules. These topics should be mutually agreed upon between the student and the instructor. Completion dates for each CBL module and related paper are shown in parentheses above.

3. A semester project in mesoscale meteorology that is mutually agreeable to the student and the instructor. The topic, objectives, and scope of the project will be summarized in a written proposal to the instructor by 10 September 2004. The proposal will be discussed with the student but not graded. The agreed upon project will be completed during the semester and summarized in a final report. The final project report will follow the format and style of a paper prepared for a meteorological professional journal, such as the Monthly Weather Review. A draft of the final project report may be given to the instructor by 23 November 2004 (recommended). The instructor will review the draft and provide comments to the student not later than 30 November 2004 for inclusion in the final report. Drafts of separate sections may be provided to the instructor for review and comment as the semester progresses. The final report will be completed and handed to the instructor by 10 December 2004.